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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/585,192	06/01/2000	Charles L. Zahm	GEH-01-060	4926

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John S Beulick
Armstrong Teasdale LLP
Suite 2600
One Metropolitan Square
St Louis, MO 63102

EXAMINER

BROADHEAD, BRIAN J

ART UNIT

PAPER NUMBER

3661

DATE MAILED: 01/02/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/585,192

Applicant(s)

ZAHM ET AL.

Examiner

Brian J. Broadhead

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-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 June 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. New formal drawings are required in this application because the drawings are unreadable. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the Patent and Trademark Office no longer prepares new drawings.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. Claims 1, 2, 3, 15, 16, 17, 30 and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Lightsey, 6005514.
4. As per claims 1, 15, 30 and 31, Lightsey discloses determining a set of phase differences between satellite reference receivers on lines 44-48, on column 9; and determining at least one of an accurate heading, heading rate, and attitude rate of the locomotive using the set of phase differences on lines 44-48, on column 9.
5. As per claims 2 and 16, Lightsey discloses the step of determining "d" (100).
6. As per claims 3 and 17, Lightsey discloses determining "d" as the function in the equations on columns 14 and 15.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 4 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lightsey, 6005514, in view of BeVan, 4999782. Lightsey discloses determining a heading from the baseline. Lightsey does not explicitly disclose using the equations of the claim to find heading and heading rate. BeVan teaches of determining the heading and heading rate on lines 40-45, on column 3 and lines 55-67, on column 6. Those formulas are basic well known vector equations. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the equations of heading and heading rate in the claims in the invention of Lightsey because they are the known equations of vector math.

9. Claims 5, 6, 7, 8, 9, 12, 13, 14, 19, 20, 22, 21, 23, 28, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lightsey, 6005514, in view of Gross et al., 6218961.

10. As per claims 5, 6, 7, 8, 9, 19, 20, 22, 21, and 23, Lightsey discloses the limitations as cited above and that angular rate of rotation is found from satellite signals on lines 53-57, on column 1. Lightsey does not disclose determining a track curvature; the track curvature is determined from angular rotation and velocity; angular rotation is

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found from a gyro and vehicle speed from a tachometer; or finding curvature from lateral acceleration and velocity. Gross et al. teaches of disclose determining a track curvature on line 35, on column 10; the track curvature is determined from angular rotation and velocity column 10; angular rotation is found from a gyro and vehicle speed from a tachometer on column 10; or finding curvature from lateral acceleration and velocity on column 10. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the curvature finding methods of Gross et al. in the invention of Lightsey because such modification would allow the use of both satellite signals and inertial sensors to both measure the same values and act as redundant systems, or to use both systems to improve accuracy of both measurements.

11. As per claims 12, 13, 14, 28, and 29, Lightsey discloses the limitations as set forth above and determining the distance traveled by the claimed equations is conventional in the art and inherent to any satellite system that measures vehicle movements. Lightsey does not disclose accessing a database of track heading and grade to determine a present track heading and grade at the determined position. Gross et al. teaches of accessing a database of track heading and grade to determine a present track heading and grade at the determined position on lines 25-41, on column 10. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the track database of Gross et al. in the invention of Lightsey because such modification would provide redundancy in the system by having the satellite determined value to compare with the database value.

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12. Claims 10, 11, 24, 25, 26, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lightsey, 6005514, in view of Gross et al., 6218961, as applied to claims 1, 5, 15, and 19 above, and further in view of Kumar, 5896947.

13. Lightsey and Gross et al. disclose all the limitations as set forth above. They do not disclose controlling the dispensing of track lubricant in accordance with track curvature; when the curvature is greater than a predetermined magnitude. Kumar teaches of the dispensing of track lubricant in accordance with track curvature and when the curvature is greater than a predetermined magnitude on columns 1, 2, and in the abstract. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the invention of Kumar with Lightsey and Gross et al. because such modification would make a track lubrication system that measures track curvature better which would make distributing the correct amount of lubricant easier.

Response to Arguments

The applicant's arguments have been considered but are not deemed persuasive. The first argument deals with Lightsey and the applicant's assertion that Lightsey does not disclose determining a phase difference between satellite reference signals and determining an accurate heading. Lightsey states that carrier phase differentials are determined on lines 44-48, on column 9. The whole GPS operating principle relies on phase differentials. Also, Lightsey discloses his invention to be usable with any moving vehicle which would include a locomotive.

With respect to the arguments to the rejection of claims 4 and 18, a new rejection has been made to cite more prior art that shows that the formulas used are vector math

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equations. The arguments for several of the other claims also deal with claims with equations that are known in the art. The arguments seem to suggest that the equations themselves are the invention. But mathematical formulas are not patentable subject matter.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Broadhead whose telephone number is 703-308-9033. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William A. Cuchlinski can be reached on 703-308-3873. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7687 for regular communications and 703-305-7687 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.

BJB
December 30, 2001


WILLIAM A. CUCHLINSKI, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3600